

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

RAYNOR, Simon, Mark
Urquhart-Dykes & Lord
Midsummer House
411C Midsummer Boulevard
Central Milton Keynes MK9 3BN
ROYAUME-UNI

Date of mailing (day/month/year) 04 October 2001 (04.10.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference SMR/P73221PC	
International application No. PCT/GB00/00202	International filing date (day/month/year) 27 January 2000 (27.01.00)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address REXAM COATED PRODUCTS LIMITED 9th floor West 114 Knightsbridge London SW1X 7NN United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☒ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address ARJO WIGGINS FINE PAPERS LIMITED Fine Papers House P.O. Box 88 Lime Tree Way Chineham, Basingstoke Hampshire RG24 8BA United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer S. Buttay
Facsimile No. (41-22) 740 14 35	Telephone No. (41-22) 338 83 38

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 August 2000 (23.08.00)	
International application No. PCT/GB00/00202	Applicant's or agent's file reference SMR/P73221PC
International filing date (day/month/year) 27 January 2000 (27.01.00)	Priority date (day/month/year) 28 January 1999 (28.01.99)
Applicant CALLAND, Stevan, George	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

10 July 2000 (10.07.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Pascal Piriou

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

RAYNOR, Simon Mark
URQUHART-DYKES & LORD
Midsummer House
411c Midsummer Boulevard
Central Milton Keynes
Bucks MK9 3BN
GRANDE BRETAGNE

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing
(day/month/year) 18.04.2001

Applicant's or agent's file reference
SMR/P73221PC

IMPORTANT NOTIFICATION

International application No.
PCT/GB00/00202

International filing date (day/month/year)
27/01/2000

Priority date (day/month/year)
28/01/1999

Applicant
REXAM COATED PRODUCTS LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

 European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
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Authorized officer

Sloan, M

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PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SMR/P73221PC		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB00/00202	International filing date (day/month/year) 27/01/2000	Priority date (day/month/year) 28/01/1999
International Patent Classification (IPC) or national classification and IPC B41M5/00		
Applicant REXAM COATED PRODUCTS LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 8 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 10/07/2000	Date of completion of this report 18.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Van Laarhoven, W Telephone No. +49 89 2399 2814 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00202

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-6 as originally filed

Claims, No.:

1-39 as received on 26/01/2001 with letter of 19/01/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00202

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:
see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1 to 10 and 12 to 36
	No:	Claims	11 and 37 to 39
Inventive step (IS)	Yes:	Claims	1 to 10 and 12 to 36
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1 to 10 and 12 to 36
	No:	Claims	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/00202

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/00202

Item IV)

The application lacks unity within the meaning of Regel 13.1 PCT for the following reasons:

A recording sheet used according to claim 1 includes a paper **substrate containing an insoluble** mineral filler, said filler including **aluminium trihydrate**. However a recording sheet used according to claim 20 includes a paper substrate having a **surface treatment including a water soluble cationic substance and a water soluble binder substance**.

It was found that the use of an insoluble aluminium filler in the base makes the paper suitable for use in the Indigo press without the need for any special surface treatment (page 3, lines 10 to 12). On the other hand the surface treated paper substrate is not required to contain aluminium trihydrate. The applicant suspects "that the group II or III metals are the key". However this may be mere speculation since "further investigation of this aspect of the invention is required" (page 4, lines 25 and 26). Moreover a use according to the claims 26 and 27 does not require any metal at all.

Moreover the invention basically concerns uses of a recording sheet in a digital printing process on a digital printing press (claims 1 and 20). However the scope of protection defined by the claims 11 and 37 concern methods of manufacturing a recording sheet per se (PCT-Guidelines C IV 7.6 (see under item V)).

Hence it is considered that the following groups of inventions are not so linked as to form a single general inventive concept:

- 1) the invention of the claims 1 to 10,
- 2) the invention of the claims 11 to 19, and
- 3) the invention of the claims 20 to 36.
- 4) the invention of the claims 37 to 39.

All inventions have been examined.

Item VIII)

The inventions mainly concern "the use of a recording sheet in a digital printing process on a digital printing press". One may derive from the passage on page 1, lines 6 and 7 of the description, that "a digital printing process on a digital printing press" has

somewhat to do with a "toner/ink transfer from printing blanket to paper". However this definition includes also melt transfer of ink to paper and even a standard pressure sensitive carbon paper.

In EP-A 0 879 917 (d5), page 2, lines 5 to 40, which is referred to on page 1, lines 17 to 19 of the description of the present application some explanation is given of what a "digital printing process on a digital printing press" may be. However it is not clear whether this explanation is exclusive.

It is therefore not clear what a "digital printing process on a digital printing press" is.

The following examination of the novelty, inventive step and industrial application is based on the assumption that a "digital printing process on a digital printing press" comprises any type of printing under the exclusion of ink jet or laser printing.

Item V)

In interpreting claims for determining novelty non-distinctive characteristics of a particular intended use should be disregarded. However characteristics not explicitly stated, but implied by the particular use, should be taken into account (PCT-Guidelines C IV 7.6).

The actual scope of the claimed protection of claims 11 and 37 is therefore "a method of manufacturing a recording sheet, the method including ...".

1) D5 is considered to represent the most relevant prior art for a use according to claim 1 and a method according to claim 10.

From d5 a use of a recording sheet in a digital printing process on a digital printing press, said recording sheet comprising a paper substrate, is known.

A use according to claim 1 and a method according to the independent claim 10 are different from the known one in that the paper substrate contains an insoluble mineral filler, said filler including aluminium trihydrate.

A use according to claim 1 and a method according to the independent claim 10 are therefore novel.

By said difference a paper of uncoated appearance is provided that is suitable for use on an Indigo press and also in other digital processes, and which also has an increased shelf life.

The cited prior art documents do not teach or suggest that said advantages could be obtained by said differences.

A paper substrate containing an insoluble mineral filler, said filler including aluminium trihydrate is known from US-A 5 593 489 (d3). However no incentive is given to a use of said known paper in a digital printing process on a digital printing press.

A use according to claim 1 and a method according to the independent claim 10 involve therefore an inventive step.

2a) From US-A 5 593 489 (d3) a method of manufacturing a recording sheet is known, the method including making up a slurry in water containing paper pulp and aluminium trihydrate, and forming the slurry into a web of paper on a paper machine (see d3, in particular column 4, lines 26 to 34 and 46 to 55).

A method according to claim 11 of the application is therefore known from d3.

2b) The methods according to the claims 12 to 19 directly and/or indirectly depend from the method according to claim 11. Said dependent claims define additional measures to the method according to claim 11.

Said additional measures are not known from d3.

Methods according to the dependent claims 12 to 19 are therefore novel.

By said additional measures a paper of uncoated appearance is provided that is suitable for use on an Indigo press and also in other digital processes, and which also has an increased shelf life.

The cited prior art documents do not teach or suggest that said advantages could be obtained by said differences.

Methods according to the dependent claims 12 to 19 involve therefore an inventive step.

3) GB-A 2 301 845 (d8) (not mentioned in the search report) is mentioned on page 4, line 18 and page 5, line 9 of the description of the present application. "The surface treatment in formulae 1 and 2 is the same as the one we claimed for pigment based ink jet on translucent paper, described in patent GB 2 301 845" (page 4, lines 17 and 18 of the description of the present application). D8 may therefore be expected to be known to the applicant.

The most relevant prior art for a use according to claim 20 is known from d8.

A use of said known recording sheet according to claim 20 of the application is different from the known one in that it concerns a use in a digital printing process on a digital printing press.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/00202

A use according to claim 20 is therefore novel.

A use according to claim 20 is based on the discovery that the known papers are suitable for use on an Indigo press and also in other digital processes.

The cited prior art documents do not teach or suggest that said advantage could be obtained by said difference.

A use according to claim 20 involves therefore an inventive step.

4) From d8 a method of manufacturing a recording sheet is known, the method including treating the surface of a paper substrate with a surface treatment including a water soluble cationic substance and a water soluble binder substance (d8, claim 17). The recording sheet is treated by applying an aqueous solution of the cationic and binder substances to the surface of the sheet (d8, claim 18). The solution is applied by drawing the semi-manufactured recording sheet through a bath of the solution (d8, claim 19).

A method according to the claims 37, 38 and 39 of the present application is therefore known from d8.

CLAIMS

1. Use of a recording sheet in a digital printing process on a digital printing press, the recording sheet including a paper substrate containing an insoluble mineral filler, said filler including aluminium trihydrate.
- 5 2. Use of a recording sheet according to claim 2, wherein the paper substrate contains between 50 and 400, preferably between 100 and 300, more preferably approximately 200 parts dry weight of aluminium trihydrate to 800 parts dry weight of pulp.
3. Use of a recording sheet according to any one of the preceding claims, wherein the recording sheet has a surface treatment including magnesium sulphate and polyvinyl
10 pyrrolidone.
4. Use of a recording sheet according to claim 3, wherein the surface treatment including magnesium sulphate and polyvinyl pyrrolidone is applied to the paper at a rate of 2 to 4g/m².
5. Use of a recording sheet according to any one of the preceding claims, wherein the
15 recording sheet has a surface treatment including starch and polyvinyl alcohol.
6. Use of a recording sheet according to claim 5, wherein the surface treatment including starch and polyvinyl alcohol includes an optical brightening agent.
7. Use of a recording sheet according to claim 5 or claim 6, wherein the surface treatment including starch and polyvinyl alcohol is applied to the paper at a rate of 1 to
20 2g/m².
8. Use of a recording sheet according to any one of the preceding claims, wherein the recording sheet has a surface treatment including a soluble or insoluble metal from Groups II and III or the Transition Metals of the Periodic Table.
9. Use of a recording sheet according to any one of the preceding claims, wherein the
25 recording sheet is substantially opaque.
10. A method of printing on a recording sheet using a digital printing press, characterised in that the recording sheet is as defined in any one of the preceding claims.

11. A method of manufacturing a recording sheet for use in a digital printing process on a digital printing press, the method including making up a slurry in water containing paper pulp and aluminium trihydrate, and forming the slurry into a web of paper on a paper machine.
- 5 12. A method according to claim 11, wherein the slurry contains between 50 and 400 parts, preferably between 100 and 300 parts, more preferably approximately 200 parts dry weight of aluminium trihydrate to 800 parts dry weight of pulp.
13. A method according to claim 11 or claim 12, the method including treating the surface of the paper with a surface treatment including magnesium sulphate and polyvinyl
10 pyrrolidone.
14. A method according to claim 13, wherein the surface treatment including magnesium sulphate and polyvinyl pyrrolidone is applied to the paper at a rate of 2 to 4g/m².
15. A method according to any one of claims 11 to 14, the method including treating the surface of the paper with a surface treatment including starch and polyvinyl alcohol.
- 15 16. A method according to claim 15, wherein the surface treatment including starch and polyvinyl alcohol includes an optical brightening agent.
17. A method according to claim 15 or claim 16, wherein the surface treatment including starch and polyvinyl alcohol is applied to the paper at a rate of 1 to 2g/m².
18. A method according to any one of claims 15 to 17 when dependent on any one
20 claims 13 and 14, wherein the surface treatment including magnesium sulphate and polyvinyl pyrrolidone and the surface treatment including starch and polyvinyl alcohol are applied to the paper surface as separate treatments.
19. A method according to any one of claims 12 to 19, the method including treating the surface of the paper with a surface treatment including a soluble or insoluble metal from
25 Groups II and III or the Transition Metals of the Periodic Table.

20. Use of a recording sheet in a digital printing process on a digital printing press, the recording sheet including a paper substrate having a surface treatment including a water soluble cationic substance and a water soluble binder substance.
21. Use of a recording sheet according to claim 20, wherein the cationic substance is a soluble polyvalent metal salt.
22. Use of a recording sheet according to claim 21, wherein the cationic substance is a salt of a metal from Groups II and III or the Transition Metals of the Periodic Table.
23. Use of a recording sheet according to claim 22, wherein the cationic substance is a salt of a cation selected from the group consisting of Mg^{2+} , Ca^{2+} , Al^{3+} , Zr^{4+} and Zn^{2+} .
24. Use of a recording sheet according to claim 23, wherein the cationic substance is magnesium sulphate.
25. Use of a recording sheet according to claim 24, wherein the amount of magnesium sulphate applied to the surface of the recording sheet is in the range $0.5-3.0g/m^2$, and preferably $1.0-2.0g/m^2$, and advantageously approximately $1.25-1.75g/m^2$.
26. Use of a recording sheet according to claim 20, wherein the cationic substance is a cationic polymer.
27. Use of a recording sheet according to claim 26, wherein the cationic substance is a poly-quaternary amine.
28. Use of a recording sheet according to any one of claims 20 to 27, wherein the binder substance is selected from a group consisting of polyvinylpyrrolidone, polyvinyl alcohol, carboxylated cellulosic polymers, polyacrylic acids, hydroxylated polyacrylates, polyacrylamides, starches and gelatine.
29. Use of a recording sheet according to claim 28, wherein the binder substance is selected from a group consisting of carboxyalkyl polymers and hydroxyalkyl polymers, and preferably hydroxymethyl cellulose and hydroxypropyl cellulose, and is more preferably carboxymethyl cellulose.

30. Use of a recording sheet according to claim 28 or claim 29, wherein the binder substance has a molecular weight in the range 790,000 to 1,350,000.
31. Use of a recording sheet according to claim 28, wherein the binder substance is polyvinyl pyrrolidone having a viscosity defined by a K-value of at least 30, and preferably
5 at least 60 and advantageously approximately 90.
32. Use of a recording sheet according to claim 31, wherein the amount of PVP applied to the surface of the recording sheet is in the range 0.15-0.75g/m², and preferably 0.4-0.7g/m², and is advantageously approximately 0.5g/m².
33. Use of a recording sheet according to any one of claims 20 to 32, in which the
10 substances are applied to the surface of the recording sheet as an aqueous solution.
34. Use of a recording sheet according to any one of the preceding claims, in which the recording sheet has a substantially uncoated appearance.
35. Use of a recording sheet according to any one of the preceding claims, the recording sheet being suitable for use on a digital press, in a lithographic printing process, for laser
15 printing, inkjet printing with dye and pigment based inks and hot melt imaging.
36. Use of a recording sheet according to any one of claims 20 to 35, wherein the recording sheet is translucent or transparent.
37. A method of manufacturing a recording sheet for use in a digital printing process on a digital printing press, the method including treating the surface of a paper substrate with
20 a surface treatment including a water soluble cationic substance and a water soluble binder substance.
38. A method according to claim 37, wherein the recording sheet is treated by applying an aqueous solution of the cationic and binder substances to the surface of the sheet.
39. A method according to claim 38, wherein the solution is applied by drawing the
25 semi-manufactured recording sheet through a bath of the solution.

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SMR/P73221PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/00202	International filing date (day/month/year) 27/01/2000	Priority date (day/month/year) 28/01/1999
International Patent Classification (IPC) or national classification and IPC B41M5/00		
Applicant REXAM COATED PRODUCTS LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 8 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 10/07/2000	Date of completion of this report 18.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Van Laarhoven, W Telephone No. +49 89 2399 2814



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00202

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-6 as originally filed

Claims, No.:

1-39 as received on 26/01/2001 with letter of 19/01/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/00202

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Item IV)

The application lacks unity within the meaning of Regel 13.1 PCT for the following reasons:

A recording sheet used according to claim 1 includes a paper **substrate containing an insoluble** mineral filler, said filler including **aluminium trihydrate**. However a recording sheet used according to claim 20 includes a paper substrate having a **surface treatment including a water soluble cationic substance and a water soluble binder substance**.

It was found that the use of an insoluble aluminium filler in the base makes the paper suitable for use in the Indigo press without the need for any special surface treatment (page 3, lines 10 to 12). On the other hand the surface treated paper substrate is not required to contain aluminium trihydrate. The applicant suspects "that the group II or III metals are the key". However this may be mere speculation since "further investigation of this aspect of the invention is required" (page 4, lines 25 and 26). Moreover a use according to the claims 26 and 27 does not require any metal at all.

Moreover the invention basically concerns uses of a recording sheet in a digital printing process on a digital printing press (claims 1 and 20). However the scope of protection defined by the claims 11 and 37 concern methods of manufacturing a recording sheet per se (PCT-Guidelines C IV 7.6 (see under item V)).

Hence it is considered that the following groups of inventions are not so linked as to form a single general inventive concept:

- 1) the invention of the claims 1 to 10,
- 2) the invention of the claims 11 to 19, and
- 3) the invention of the claims 20 to 36.
- 4) the invention of the claims 37 to 39.

All inventions have been examined.

Item VIII)

The inventions mainly concern "the use of a recording sheet in a digital printing process on a digital printing press". One may derive from the passage on page 1, lines 6 and 7 of the description, that "a digital printing process on a digital printing press" has

somewhat to do with a "toner/ink transfer from printing blanket to paper". However this definition includes also melt transfer of ink to paper and even a standard pressure sensitive carbon paper.

In EP-A 0 879 917 (d5), page 2, lines 5 to 40, which is referred to on page 1, lines 17 to 19 of the description of the present application some explanation is given of what a "digital printing process on a digital printing press" may be. However it is not clear whether this explanation is exclusive.

It is therefore not clear what a "digital printing process on a digital printing press" is.

The following examination of the novelty, inventive step and industrial application is based on the assumption that a "digital printing process on a digital printing press" comprises any type of printing under the exclusion of ink jet or laser printing.

Item V)

In interpreting claims for determining novelty non-distinctive characteristics of a particular intended use should be disregarded. However characteristics not explicitly stated, but implied by the particular use, should be taken into account (PCT-Guidelines C IV 7.6).

The actual scope of the claimed protection of claims 11 and 37 is therefore "a method of manufacturing a recording sheet, the method including ...".

1) D5 is considered to represent the most relevant prior art for a use according to claim 1 and a method according to claim 10.

From d5 a use of a recording sheet in a digital printing process on a digital printing press, said recording sheet comprising a paper substrate, is known.

A use according to claim 1 and a method according to the independent claim 10 are different from the known one in that the paper substrate contains an insoluble mineral filler, said filler including aluminium trihydrate.

A use according to claim 1 and a method according to the independent claim 10 are therefore novel.

By said difference a paper of uncoated appearance is provided that is suitable for use on an Indigo press and also in other digital processes, and which also has an increased shelf life.

The cited prior art documents do not teach or suggest that said advantages could be obtained by said differences.

A paper substrate containing an insoluble mineral filler, said filler including aluminium trihydrate is known from US-A 5 593 489 (d3). However no incentive is given to a use of said known paper in a digital printing process on a digital printing press.

A use according to claim 1 and a method according to the independent claim 10 involve therefore an inventive step.

2a) From US-A 5 593 489 (d3) a method of manufacturing a recording sheet is known, the method including making up a slurry in water containing paper pulp and aluminium trihydrate, and forming the slurry into a web of paper on a paper machine (see d3, in particular column 4, lines 26 to 34 and 46 to 55).

A method according to claim 11 of the application is therefore known from d3.

2b) The methods according to the claims 12 to 19 directly and/or indirectly depend from the method according to claim 11. Said dependent claims define additional measures to the method according to claim 11.

Said additional measures are not known from d3.

Methods according to the dependent claims 12 to 19 are therefore novel.

By said additional measures a paper of uncoated appearance is provided that is suitable for use on an Indigo press and also in other digital processes, and which also has an increased shelf life.

The cited prior art documents do not teach or suggest that said advantages could be obtained by said differences.

Methods according to the dependent claims 12 to 19 involve therefore an inventive step.

3) GB-A 2 301 845 (d8) (not mentioned in the search report) is mentioned on page 4, line 18 and page 5, line 9 of the description of the present application. "The surface treatment in formulae 1 and 2 is the same as the one we claimed for pigment based ink jet on translucent paper, described in patent GB 2 301 845" (page 4, lines 17 and 18 of the description of the present application). D8 may therefore be expected to be known to the applicant.

The most relevant prior art for a use according to claim 20 is known from d8.

A use of said known recording sheet according to claim 20 of the application is different from the known one in that it concerns a use in a digital printing process on a digital printing press.

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A use according to claim 20 is therefore novel.

A use according to claim 20 is based on the discovery that the known papers are suitable for use on an Indigo press and also in other digital processes.

The cited prior art documents do not teach or suggest that said advantage could be obtained by said difference.

A use according to claim 20 involves therefore an inventive step.

4) From d8 a method of manufacturing a recording sheet is known, the method including treating the surface of a paper substrate with a surface treatment including a water soluble cationic substance and a water soluble binder substance (d8, claim 17). The recording sheet is treated by applying an aqueous solution of the cationic and binder substances to the surface of the sheet (d8, claim 18). The solution is applied by drawing the semi-manufactured recording sheet through a bath of the solution (d8, claim 19).

A method according to the claims 37, 38 and 39 of the present application is therefore known from d8.

**REPLACED BY
ART 14 AMST**CLAIMS

1. A recording sheet for use on a digital press, the recording sheet including a paper substrate containing an insoluble mineral filler including a Lewis acid.
2. A recording sheet according to claim 1, wherein the Lewis acid includes aluminium trihydrate.
5
3. A recording sheet according to claim 2, wherein the paper substrate contains between 50 and 400, preferably between 100 and 300, more preferably approximately 200 parts dry weight of aluminium trihydrate to 800 parts dry weight of pulp.
4. A recording sheet according to any one of the preceding claims, wherein the
10 recording sheet has a surface treatment including magnesium sulphate and polyvinyl pyrrolidone.
5. A recording sheet according to claim 4, wherein the surface treatment including magnesium sulphate and polyvinyl pyrrolidone is applied to the paper at a rate of 2 to 4g/m².
6. A recording sheet according to any one of the preceding claims, wherein the
15 recording sheet has a surface treatment including starch and polyvinyl alcohol.
7. A recording sheet according to claim 6, wherein the surface treatment including starch and polyvinyl alcohol includes an optical brightening agent.
8. A recording sheet according to claim 6 or claim 7, wherein the surface treatment including starch and polyvinyl alcohol is applied to the paper at a rate of 1 to 2g/m².
- 20 9. A recording sheet according to any one of the preceding claims, wherein the recording sheet has a surface treatment including a soluble or insoluble metal from Groups II and III or the Transition Metals of the Periodic Table.
10. A recording sheet according to any one of the preceding claims, wherein the recording sheet is substantially opaque.
- 25 11. A method of printing on a recording sheet using a digital printing press, characterised in that the recording sheet is as defined in any one of the preceding claims.

12. A method of manufacturing a recording sheet for use on a digital press, the method including making up a slurry in water containing paper pulp and aluminium trihydrate, and forming the slurry into a web of paper on a paper machine.
13. A method according to claim 12, wherein the slurry contains between 50 and 400 parts, preferably between 100 and 300 parts, more preferably approximately 200 parts dry weight of aluminium trihydrate to 800 parts dry weight of pulp.
14. A method according to claim 12 or claim 13, the method including treating the surface of the paper with a surface treatment including magnesium sulphate and polyvinyl pyrrolidone.
15. A method according to claim 14, wherein the surface treatment including magnesium sulphate and polyvinyl pyrrolidone is applied to the paper at a rate of 2 to 4g/m².
16. A method according to any one of claims 12 to 15, the method including treating the surface of the paper with a surface treatment including starch and polyvinyl alcohol.
17. A method according to claim 16, wherein the surface treatment including starch and polyvinyl alcohol includes an optical brightening agent.
18. A method according to claim 16 or claim 17, wherein the surface treatment including starch and polyvinyl alcohol is applied to the paper at a rate of 1 to 2g/m².
19. A method according to any one of claims 16 to 18 when dependent on any one claims 14 and 15, wherein the surface treatment including magnesium sulphate and polyvinyl pyrrolidone and the surface treatment including starch and polyvinyl alcohol are applied to the paper surface as separate treatments.
20. A recording sheet according to any one of the preceding claims, wherein the recording sheet has a surface treatment including a soluble or insoluble metal from Groups II and III or the Transition Metals of the Periodic Table.
21. A recording sheet for use on a digital press, the recording sheet including a paper substrate having a surface treatment including a water soluble cationic substance and a water soluble binder substance.

22. A recording sheet according to claim 21, wherein the cationic substance is a soluble polyvalent metal salt.
23. A recording sheet according to claim 22, wherein the cationic substance is a salt of a metal from Groups II and III or the Transition Metals of the Periodic Table.
- 5 24. A recording sheet according to claim 23, wherein the cationic substance is a salt of a cation selected from the group consisting of Mg^{2+} , Ca^{2+} , Al^{3+} , Zr^{4+} and Zn^{2+} .
25. A recording sheet according to claim 24, wherein the cationic substance is magnesium sulphate.
26. A recording sheet according to claim 25, wherein the amount of magnesium sulphate
10 applied to the surface of the recording sheet is in the range $0.5-3.0g/m^2$, and preferably $1.0-2.0g/m^2$, and advantageously approximately $1.25-1.75g/m^2$.
27. A recording sheet according to claim 21, wherein the cationic substance is a cationic polymer.
28. A recording sheet according to claim 27, wherein the cationic substance is a poly-
15 quaternary amine.
29. A recording sheet according to any one of claims 21 to 28, wherein the binder substance is selected from a group consisting of polyvinylpyrrolidone, polyvinyl alcohol, carboxylated cellulosic polymers, polyacrylic acids, hydroxylated polyacrylates, polyacrylamides, starches and gelatine.
- 20 30. A recording sheet according to claim 29, wherein the binder substance is selected from a group consisting of carboxyalkyl polymers and hydroxyalkyl polymers, and preferably hydroxymethyl cellulose and hydroxypropyl cellulose, and is more preferably carboxymethyl cellulose.
31. A recording sheet according to claim 29 or claim 30, wherein the binder substance
25 has a molecular weight in the range 790,000 to 1,350,000.

32. A recording sheet according to claim 29, wherein the binder substance is polyvinyl pyrrolidone having a viscosity defined by a K-value of at least 30, and preferably at least 60 and advantageously approximately 90.
33. A recording sheet according to claim 32, wherein the amount of PVP applied to the surface of the recording sheet is in the range 0.15-0.75g/m², and preferably 0.4-0.7g/m², and is advantageously approximately 0.5g/m².
34. A recording sheet according to any one of claims 21 to 33, in which the substances are applied to the surface of the recording sheet as an aqueous solution.
35. A recording sheet according to any one of claims 21 to 34, in which the recording sheet has a substantially uncoated appearance.
36. A recording sheet according to any one of claims 21 to 35, the recording sheet being suitable for use on a digital press, in a lithographic printing process, for laser printing, inkjet printing with dye and pigment based inks and hot melt imaging.
37. A recording sheet according to any one of claims 21 to 36, wherein the recording sheet is translucent or transparent.
38. A method of manufacturing a recording sheet for use on a digital press, the method including treating the surface of a paper substrate with a surface treatment including a water soluble cationic substance and a water soluble binder substance.
39. A method according to claim 38, wherein the recording sheet is treated by applying an aqueous solution of the cationic and binder substances to the surface of the sheet.
40. A method according to claim 39, wherein the solution is applied by drawing the semi-manufactured recording sheet through a bath of the solution.
41. A sheet of paper with a substantially uncoated appearance for use on a digital press, the paper having a surface treatment including a water soluble cationic substance and a water soluble binder substance.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference SMR/P73221PC	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 00202	International filing date (day/month/year) 27/01/2000	(Earliest) Priority Date (day/month/year) 28/01/1999
Applicant REXAM COATED PRODUCTS LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 03 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

INK-RECEPTOR SHEET FOR USE AS A RECORDING MATERIAL

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

A recording sheet for use on a digital press includes either insoluble aluminium trihydrate in the base paper or magnesium sulphate at the surface. According to a second aspect of the invention, the recording sheet includes a paper substrate having a surface treatment including a water soluble cationic substance and a water soluble binder substance.

INTERNATIONAL SEARCH REPORT

International Application No

P B 00/00202

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B41M5/00 D21H17/65 D21H17/67 G03G7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B41M D21H G03G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 887 199 A (MITSUBISHI PAPER MILLS, LIMITED) 30 December 1998 (1998-12-30) page 3, line 33 - line 45 page 6, line 10 - line 25 page 7, line 15 - line 53 claims 1,8,9; examples 1-25 ---	1-3, 6-13, 16-24, 27-41
X	EP 0 673 779 A (MITSUBISHI PAPER MILLS, LIMITED) 27 September 1995 (1995-09-27) page 3, line 36 -page 4, line 10 page 8, line 23 -page 9, line 37 page 10, line 5 - line 30 claims 1,6,10,13,17; examples 1-39 --- -/--	1-3, 6-13, 16-18, 20-41

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

Date of the actual completion of the international search

17 April 2000

Date of mailing of the international search report

02/05/2000

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INTERNATIONAL SEARCH REPORT

International Application No

PC 8 00/00202

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 593 489 A (K-T. WU) 14 January 1997 (1997-01-14) column 2, line 12 - line 28 column 4, line 1 - line 8 claims 1,2,5,18; examples 1,2 ---	1-3, 10
X	EP 0 734 881 A (NIPPON PAPER INDUSTRIES COMPANY LIMITED) 2 October 1996 (1996-10-02) page 3, line 1 - line 27 page 4, line 47 -page 5, line 11 claims 1-9; examples 1-6 ---	21-41
X	EP 0 879 917 A (ARJO WIGGINS FINE PAPERS LIMITED) 25 November 1998 (1998-11-25) cited in the application page 2, line 55 -page 3, line 11 claims 1,4-10; examples 1-5 ---	21-41
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 3, 27 February 1998 (1998-02-27) & JP 09 290556 A (MITSUBISHI PAPER MILLS, LIMITED), 11 November 1997 (1997-11-11) abstract ---	21-41
X	PATENT ABSTRACTS OF JAPAN vol. 10, no. 200 (M-498), 12 July 1986 (1986-07-12) & JP 61 043593 A (MITSUBISHI PAPER MILLS, LIMITED), 3 March 1986 (1986-03-03) abstract -----	21-41

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

P B 00/00202

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 887199	A	30-12-1998	JP 11011006 A	19-01-1999
			JP 11011007 A	19-01-1999
			JP 11011008 A	19-01-1999
EP 673779	A	27-09-1995	JP 7290818 A	07-11-1995
			US 5882755 A	16-03-1999
US 5593489	A	14-01-1997	AU 712568 B	11-11-1999
			AU 7449796 A	07-05-1997
			EP 0882100 A	09-12-1998
			JP 11513659 T	24-11-1999
			WO 9714755 A	24-04-1997
EP 734881	A	02-10-1996	JP 2840042 B	24-12-1998
			JP 8260382 A	08-10-1996
			AU 692077 B	28-05-1998
			AU 5036396 A	10-10-1996
			DE 69603396 D	02-09-1999
			DE 69603396 T	20-01-2000
			US 5753082 A	19-05-1998
EP 879917	A	25-11-1998	NONE	
JP 09290556	A	11-11-1997	NONE	
JP 61043593	A	03-03-1986	JP 1850887 C	21-06-1994
			JP 5057114 B	23-08-1993